

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference ATHBY/ P32968PC	FOR FURTHER ACTION see Form PCT/ISA/220 as well as, where applicable, item 5 below.	
International application No. PCT/GB2005/001463	International filing date (day/month/year) 15/04/2005	(Earliest) Priority Date (day/month/year) 15/04/2004
Applicant ATHERA BIOTECHNOLOGIES AB		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 9 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the **language**, the international search was carried out on the basis of:

- ☒ the international application in the language in which it was filed
☐ a translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))

b. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. ☒ **Certain claims were found unsearchable** (See Box No. II)

3. ☒ **Unity of invention is lacking** (see Box No III)

4. With regard to the **title**,

- ☐ the text is approved as submitted by the applicant
☒ the text has been established by this Authority to read as follows:

PHOSPHORYLCHOLINE CONJUGATES AND CORRESPONDING ANTIBODIES

5. With regard to the **abstract**,

- ☒ the text is approved as submitted by the applicant
☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority

6. With regard to the **drawings**,

- a. the figure of the **drawings** to be published with the abstract is Figure No. 4
☐ as suggested by the applicant
☐ as selected by this Authority, because the applicant failed to suggest a figure
☒ as selected by this Authority, because this figure better characterizes the invention
- b. ☐ none of the figures is to be published with the abstract

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A. CLASSIFICATION OF SUBJECT MATTER

C07K16/44 A61K47/48 G01N33/92 G01N33/68

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A61K G01N C07K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, DISSERTATION ABS, CHEM ABS Data, EMBASE, BIOSIS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>DATABASE DISSERTATION ABSTRACTS 'Online! ProQuest Info&Learning; 2002, BINDER, CHRISTOPH JOHANNES: "Defining innate and adaptive immune mechanisms in the atheroprotective effect of immunization with oxidized low-density lipoproteins" XP002355546 retrieved from DIALOG accession no. 01907366 Database accession no. AADAA-I3064459 abstract & DISSERTATION ABSTRACTS INTERNATIONAL, vol. 63, no. 09-b, 2002, page 4109, -/--</p>	1-9



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *G* document member of the same patent family

Date of the actual completion of the international search

10 February 2006

Date of mailing of the international search report

24/02/2006

Name and mailing address of the ISA/

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Dullaart, A

INTERNATIONAL SEARCH REPORT

International application No

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
	& BINDER, CHRISTOPH JOHANNES: "Ph. D. thesis" 2002, UNIVERSITY OF CALIFORNIA, SAN DIEGO, US ISBN: 0-493-83264-5 -----	
X	BINDER, CHRISTOPH J. ET AL: "Pneumococcal vaccination decreases atherosclerotic lesion formation: molecular mimicry between Streptococcus pneumoniae and oxidized LDL" NATURE MEDICINE, vol. 9, no. 6, June 2003 (2003-06), pages 736-743, XP002355525 ISSN: 1078-8956 abstract page 738, left-hand column, last paragraph - page 740, left-hand column, paragraph 3 -----	1-9
X	ROSE N ET AL: "Autoimmunity: Busting the atherosclerotic plaque" NATURE MEDICINE 01 JUN 2003 UNITED STATES, vol. 9, no. 6, 1 June 2003 (2003-06-01), pages 641-642, XP002355526 ISSN: 1078-8956 page 641, left-hand column, paragraph 3 -----	1-9
X	BINDER C J ET AL: "Innate and acquired immunity in atherogenesis" NATURE MEDICINE 01 NOV 2002 UNITED STATES, vol. 8, no. 11, 1 November 2002 (2002-11-01), pages 1218-1226, XP002355527 ISSN: 1078-8956 figure 3 page 1224, right-hand column, paragraph 2 -----	1-9
X	SHAW P X ET AL: "The autoreactivity of anti-phosphorylcholine antibodies for atherosclerosis-associated neo-antigens and apoptotic cells" JOURNAL OF IMMUNOLOGY 15 JUN 2003 UNITED STATES, vol. 170, no. 12, 15 June 2003 (2003-06-15), pages 6151-6157, XP002355528 ISSN: 0022-1767 abstract table 1 figure 1 page 6153, right-hand column page 6155, left-hand column, last paragraph - page 6156, left-hand column, line 5 -----	1-9
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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>BINDER CHRISTOPH J ET AL: "Molecular mimicry between epitopes of oxidized LDL and Streptococcus pneumoniae"</p> <p>ABSTRACTS FROM AMERICAN HEART ASSOCIATION SCIENTIFIC SESSIONS 2000, 'Online! 12 November 2000 (2000-11-12), XP002355529 NEW ORLEANS, LOUISIANA, US, Abstract ID: 108867</p> <p>Retrieved from the Internet: URL:http://aha.agora.com/abstractviewer> 'retrieved on 2005-11-10! the whole document & CIRCULATION, vol. 102, no. 18, Supplement, 31 October 2000 (2000-10-31), pages II.114-II.115, ISSN: 0009-7322</p>	1-9
Y	<p>PURKALL D ET AL: "Opsonization of Actinobacillus actinomycetemcomitans by immunoglobulin G antibody reactive with phosphorylcholine"</p> <p>INFECTION AND IMMUNITY 2002 UNITED STATES, vol. 70, no. 11, 2002, pages 6485-6488, XP002355530 ISSN: 0019-9567 abstract page 6485, right-hand column, paragraph 2 page 6486, left-hand column, paragraph 3</p>	1-9
Y	<p>US 5 455 032 A (KENNY ET AL) 3 October 1995 (1995-10-03) cited in the application examples claims table 2</p>	1-9
Y	<p>WO 99/33522 A (BOARD OF REGENTS, THE UNIVERSITY OF TEXAS SYSTEM; SCHROIT, ALAN, J) 8 July 1999 (1999-07-08) examples claims</p>	1-15
Y	<p>SHOJI TETSUO ET AL: "Inverse relationship between circulating oxidized low density lipoprotein (oxLDL) and anti-oxLDL antibody levels in healthy subjects"</p> <p>ATHEROSCLEROSIS, vol. 148, no. 1, January 2000 (2000-01), pages 171-177, XP002355531 ISSN: 0021-9150 abstract page 174, paragraph DISCUSSION - page 176, left-hand column, last line</p>	1-9
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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 02/080954 A (FORSKARPATENT I SYD) 17 October 2002 (2002-10-17) cited in the application examples claims	1-9
Y	WO 01/68119 A (KAROLINSKA INNOVATIONS AB; HANSSON, GOERAN, K; STEMME, STEN; NICOLETTI) 20 September 2001 (2001-09-20) cited in the application examples claims	1-9
X	KEARNEY JOHN F: "Immune recognition of OxLDL in atherosclerosis" JOURNAL OF CLINICAL INVESTIGATION, vol. 105, no. 12, June 2000 (2000-06), pages 1683-1685, XP002367018 ISSN: 0021-9738 page 1683, right-hand column, last paragraph - page 1684, middle column, paragraph 1; figure 1	10-16
Y	WO 01/32070 A (THE REGENTS OF THE UNIVERSITY OF CALIFORNIA; WITZTUM, JOSEPH; TSIMIKAS) 10 May 2001 (2001-05-10)	1-3,9
X	page 17 - page 18 claims 10-16	10-15
X	CHYU KUANG-YUH ET AL: "Changes in innate and adaptive humoral immune responses and indices of atherosclerosis in aging." JOURNAL OF THE AMERICAN COLLEGE OF CARDIOLOGY, vol. 43, no. 5, Supplement A, 3 March 2004 (2004-03-03), page 499A, ABSTRACT NO. 1122-173, XP002367019 & 53RD ANNUAL SCIENTIFIC SESSION OF THE AMERICAN COLLEGE OF CARDIOLOGY; NEW ORLEANS, LA, USA; MARCH 07-10, 2004 ISSN: 0735-1097 the whole document	10-16
X	WO 93/18161 A (THE ROCKEFELLER UNIVERSITY) 16 September 1993 (1993-09-16) page 16, line 34 - page 17, line 10	10-16
X	WO 90/12632 A (THE UNITED STATES OF AMERICA, REPRESENTED BY THE S) 1 November 1990 (1990-11-01) examples claims	1-3,9
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International application No

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 475 100 A (HASHINO ET AL) 12 December 1995 (1995-12-12) example 4	10-15
Y	----- KOH-ZOH KAMEYAMA ET AL: "CONVENIENT PLASMID VECTORS FOR CONSTRUCTION OF CHIMERIC MOUSE/HUMAN ANTIBODIES" FEBS LETTERS, ELSEVIER, AMSTERDAM, NL, vol. 244, no. 2, 27 February 1989 (1989-02-27), pages 301-306, XP000007812 ISSN: 0014-5793 abstract page 304, left-hand column, paragraph 3.3	1-3,9
X	----- SHAW PETER X ET AL: "Natural antibodies with the T15 idiotype may act in atherosclerosis, apoptotic clearance, and protective immunity" JOURNAL OF CLINICAL INVESTIGATION, vol. 105, no. 12, June 2000 (2000-06), pages 1731-1740, XP002204419 ISSN: 0021-9738 abstract page 1736, left-hand column, paragraph 2 - right-hand column, paragraph 18	10-16
Y	----- EP 0 466 505 A (FUJITA HEALTH UNIVERSITY; TAKARA SHUZO CO. LTD) 15 January 1992 (1992-01-15) examples	1-3,9
Y	----- WO 94/14454 A (ENTREMED, INC) 7 July 1994 (1994-07-07) examples	1-9
Y	----- US 5 955 584 A (DITLOW ET AL) 21 September 1999 (1999-09-21) abstract column 206 - column 210, line 25 column 210, line 38 - column 211, line 33	1-3,9-15
P,Y	----- US 2004/185039 A1 (KOHLEER HEINZ ET AL) 23 September 2004 (2004-09-23) paragraph '0042! - paragraph '0043! -----	1-3,9

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International application No.
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Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

Although claim 9 is directed to a method of treatment of the human/animal body, a search has been carried out, based on the alleged effects of the compound/composition.
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-3 and 9 in part, and 4-8

Use of a phosphorylcholine conjugate in the treatment of atherosclerosis or related disease, and corresponding method of prophylactic or therapeutic treatment.

2. claims: 1-3 and 9 in part

Use of an antibody specific for a phosphorylcholine conjugate in the treatment of atherosclerosis or related disease, and corresponding method of prophylactic or therapeutic treatment.

3. claims: 10-15

Method of diagnosing the presence or absence of IgM or IgG antibodies as defined in these claims.

4. claim: 16

Use of a phosphorylcholine conjugate for assessing a patient's risk of developing or progression of ischemic cardiovascular disease as defined in this claim.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/GB2005/001463

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5455032	A	03-10-1995	NONE	
WO 9933522	A	08-07-1999	AU 2210899 A	19-07-1999
			CA 2317120 A1	08-07-1999
			EP 1044013 A2	18-10-2000
			US 6300308 B1	09-10-2001
			US 2003004097 A1	02-01-2003
WO 02080954	A	17-10-2002	BR 0208685 A	30-03-2004
			CA 2443223 A1	17-10-2002
			CN 1505525 A	16-06-2004
			EE 200300487 A	16-02-2004
			EP 1383526 A1	28-01-2004
			JP 2004529143 T	24-09-2004
			PL 367301 A1	21-02-2005
			SE 0103754 A	06-10-2002
WO 0168119	A	20-09-2001	AU 4295201 A	24-09-2001
			EP 1335742 A1	20-08-2003
			US 2004002111 A1	01-01-2004
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			AU 3790801 A	14-05-2001
			CA 2389849 A1	10-05-2001
			EP 1224461 A2	24-07-2002
			JP 2003513027 T	08-04-2003
			MX PA02004244 A	04-11-2002
WO 9318161	A	16-09-1993	AU 3992597 A	12-02-1998
			CA 2131150 A1	16-09-1993
			EP 0631624 A1	04-01-1995
			JP 7504817 T	01-06-1995
WO 9012632	A	01-11-1990	AU 5522390 A	16-11-1990
US 5475100	A	12-12-1995	NONE	
EP 0466505	A	15-01-1992	DE 69111930 D1	21-09-1995
			DE 69111930 T2	04-01-1996
			JP 3283041 B2	20-05-2002
			JP 6087899 A	29-03-1994
WO 9414454	A	07-07-1994	AU 5959494 A	19-07-1994
US 5955584	A	21-09-1999	NONE	
US 2004185039	A1	23-09-2004	NONE	